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(1) TITLE OF THE INVENTION

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VEHICLE RAPID DECELERATION RELATED INJURY-COUNTERACTING EQUIPMENT

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(2) BACKGROUND TO THE INVENTION

Vehicle accidents often involve the rapid deceleration of a vehicle. In the case of a car or the like the situation is often encountered in head on collisions but not necessarily limited thereto. In the case aircraft an emergency landing has the same effect. Whether or not such rapid deceleration is the result of an accident involving condition the person or persons travelling along are under such circumstances often exposed to a potentially bodily injuring situation even if not causing external injuries. This can result from the whiplash effect caused by such rapid deceleration even if a seat belt is worn. Where the person(s) involved are the occupants of the front seat of a car, a head on collision often causes the steering wheel and dashboard of the car to become pushed into the seating position of the occupants of the front seats resulting in serious bodily injury to such occupants.

(3) FIELD OF THE INVENTION

This invention relates to vehicle rapid deceleration related injury-counteracting equipment used in reducing vehicular travelling exposure to injury resulting from rapid vehicular deceleration. Although not so limited the invention finds useful application in re-adjusting the seating position in a vehicle for some or other reason being subject to rapid deceleration to counteract the possibility of an occupant becoming injured by such occurrence.

(4) PRIOR ART DESCRIPTION

Injury resulting from rapid deceleration is conventionally counteracted by way of safety belts as worn by the occupants of seats. A very useful recent development is the fitting of rapidly inflatable bags to especially cars to rapidly form a cushion between the occupant of a front seat and car equipment such as the steering wheel in the case of an accident. While the equipment described contribute substantially to reducing the possibility of bodily injury

further equipment that can independently or in supplementing the already known equipment contribute to reducing bodily injury can only make a contribution to safeguard driving conditions.

5 (5) BRIEF DESCRIPTION OF THE DRAWING

The invention is now described, by way of example, with reference to the accompanying drawings. In the drawings

10 Figure 1 shows in side elevation one embodiment of vehicle rapid deceleration related injury-counteracting equipment in the form of a vehicle securable attachment via which a vehicle seat becomes attached to a vehicle in a way that renders it rearwardly swivellable in the case of sudden vehicular deceleration for limiting the possibility of injury to the occupant of a seat,

15 Figure 2 shows one side of the attachment of figure 1 in sectioned end view along section line A-A in figure 1(a),

20 Figure 3 shows the attachment of figures 1 and 2 as operatively installed and fitted with a seat,

Figure 4 shows in side elevation another embodiment of the attachment as operatively installed and fitted with a seat,

25 Figure 5 shows in side elevation yet another embodiment of the attachment as operatively installed and fitted with a seat, and

Figure 6 shows one side of the attachment of figure 5 in sectioned end view along section line B-B in figure 5(b).

(6) DETAILED DESCRIPTION OF THE DRAWINGS

Referring to the drawings vehicle rapid deceleration related injury-counteracting equipment in the form of a vehicle securable attachment, according to the invention, via which a vehicle seat is attached to a vehicle to render it rearwardly swivellable in the case of rapid vehicular deceleration, is generally indicated by reference numeral 10.

The attachment 10 comprises arcuately extending path defining means mountable to cause its leading end to extend upward once the attachment 10 is operatively fitted, in the form of a pair of arcuately formed rails 12 along which traveller holding position defining means in the form of a conventional vehicle seat 14 is moveable up to a position of stoppage by being fitted to each rail via a carrier arrangement generally indicated by reference numeral 16 and as discussed in more detail below, and a locking facility releasably securing the carrier arrangement 16 to each of the rails 12 in a normal seating position as shown in figures 3(a), 4(a) and 5(a).

Referring to figures 1 to 4, the carrier arrangement 16 provides runners 20 engaging rollably to the rails 12. As more clearly seen in figure 2, each runner 20 is in the form of a saddle-like rail engaging formation 22 fitted with cylindrical rollers 24 spaced to define a rail engaging path 26 there along, as shown in figure 1, that promotes proper engagement of the runners 20 to their rails 12. To this effect and referring to figures 1 to 3 each runner 20 is fitted with two overhead rollers 24.1 defining the upper boundary of the rail engaging path 26, as shown in figure 1, and a bottom roller 24.2 forming the lower boundary. Where the lengths of the rails 12 are required to be short, as shown in figure 4 and as perhaps necessitated by the location of fitting of the attachment 10 to the body of a vehicle, resulting in the leading ends 20.1 of the runners 20 leaving their rails 12 once caused to move into their seat tilting conditions, as shown in figure 4(b), the runners 20 make provision for an adequate number of rollers 24 to maintain their firm engagement to the rails 12. This is the case even if the leading ends of the runners 20 travel beyond the leading ends of the rails 12 once in their seat tilting conditions. As shown in figure 4 the runners 20 are in such case fitted with three or even more overhead rollers 24.1 to maintain a firm but easily displaceable fit between the runners 20 and their rails 12.

As shown in figure 2 the rails 12 present rectangular profiles each of an outline size matching with the shape of the rail engaging path 26 defined along the rollers 24 and the legs of the saddle formation 22.

5 The runners 20 are maintained in the position of normal seating as shown in figure 3(a) and 4(a) by means of the locking facility provided by a shear pin 18 passing along registering apertures 19 in the runners 20 and the rails 12. The force required to shear the pins 18 on deceleration of a vehicle fitted with the attachment 10 in turn carrying a seat 14 is pre-established to ensure that such shearing will only occur under emergency conditions
 10 involving rapid vehicular deceleration. The stoppage position of each runner 20 along its rail 12 is formed by a stopper pin 28 extending below the bottom race of each rail 12. Displacement of the runners 20 is thus terminated on their bottom rollers 24.2 coming into abutment with the appropriate pins 28. The pins 28 are naturally adequately strongly secured to the rails 12 to enable them to positively stop the seat 14 once occupied and fitted
 15 to the runners 20 when the attachment 10 is operatively fitted to a vehicle that becomes subject to an adequately rapid decelerating force to have caused the release of the runners 20 from their shear pins 18.

20 The rails 12 extend between legs 30 used for operatively bolting or otherwise securing the attachment 10 to the floor of a vehicle. Operative location of the attachment 10 involves its anchoring via conventional seat to vehicle body anchoring means. As shown in figures 3 and 4 the seat 14 is securely fitted via its base engaging support 32 providing the seat engaging base, to the runners 20. When the attachment 10 is used to supplement an existing vehicle seat the latter is thus simply released from its anchoring location and fitted to
 25 the runners 20 via its support 32 once the attachment 10 is anchored via the conventional seat anchoring means to the vehicle.

Referring to figures 5 and 6 and in another embodiment the attachment 10 is configured to be inter-spaced between the upper bed 14.1 of the seat 14 and its base engaging support 34.
 30 The carrier arrangement 16 is provided by roller wheels 36 that are rollably fitted alongside a seat attachment support 38 by way of connecting arms 39 also serving as runner shafts. The wheels 36 engage curtain rail fashion with the rails 12. The rails 12 are secured to rail carriers 40 in turn secured by means of brackets 41 to the base engaging support 34.

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Stoppage of the wheels 36 along the rails 12 are caused by the leading end 12.2 of each rail 12 being closed off. The wheels 36 are locked to their rails 12 in the conventional seat upright position by locking facilities such as rail stops ahead of the wheels 36 (not shown) permitting wheel release by passing over the stops in response to the exertion of the appropriate forward force on the attachment 10 by the seat 14 as occupied on deceleration of the vehicle modified by means of the attachment 10.

The seat 14 of the figure 5 embodiment is directly fitted to the support 38 with the leading ends of the rails 12 entering the upper bed 14.1 of the seat 14 when the latter is in its normal use condition, as shown in figure 5(a). Fitting of the attachment 10 of the figure 5 embodiment to a standard vehicle seat involves separating the upper bed 16.1 of the seat from its base engaging support 34 and securing the latter and the upper bed 14.1 to opposite sides of the rail carrier 40.

In use and referring to all the drawings the seat 14 of a vehicle fitted with an attachment 10 in under normal use conditions in the position shown in figures 3(a), 4(a) and 5(a). Under these circumstances the seat 14 is locked towards the trailing ends of the rails 12 by means of the locking facilities such as the shear pins 18.

Once a vehicle fitted with the adapted seat 14 is subject to rapid deceleration, the seat 14, as appropriately occupied, is urged forward. A force is thus exerted on the positions of locking between the carrier arrangement 16 as carrying the occupied seat 16 and the rails 20, whether by way of the shear pin 18 or otherwise, depending on the locking configuration between the seat 14 and the rails 12. When this force exceeds a magnitude that has been pre-established the locking effect is broken resulting in the rapid forward movement of the carrier arrangement 16 and seat 14 assembly. In the case of the figures 3 and 4 embodiments breaking of the locking effect between the carrier 16 and the rails 12 involves the shearing of the pins 18.

Once the seat 14 is released it commences rapid travelling along its rails 12 in the direction of arrow 44 as shown figures 3(b), 4(b) and 5 (b). The arcuate shape of the rails 12 simultaneously cause the seat 14 to swivel backward in the direction of arrow 46 during forward progression. It will be appreciated that the forward travelling of the seat 14 and the

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simultaneous backward swivelling occur substantially instantaneously owing to the magnitude of the force exerted by the deceleration while the carrier arrangement 16 and seat 14 assembly move forward under their momentum. The carrier arrangement 16 thus travels up to the position of stoppage in which the seat 14 is situated in the position as shown in figures 3(b), 4(b) and 5(b). The occupant as wearing a conventional safety belt (not shown in the drawings) to hold such person to the seat at least when a vehicle is subject to rapid deceleration is thus tilted to lie backward. It will be appreciated that the safety belt must be anchored in such a way to the seat that it does not obstruct the backward swivelling action.

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The backward tilting of the occupant of the seat 14 has the advantageous effect of reducing the whiplash that is associated with very rapid deceleration of a vehicle as the occupant is swivelled away from the normal upright sitting position. Where the sudden deceleration involves a head on crash, that is often the situation when such deceleration occurs, fixed vehicle equipment such as a steering wheel and a dashboard are often forced into the seating position of the front seats. The rearward tilting in such case has the additional beneficial effect of removing the occupant out of the line of inward displacement of such equipment. A further benefit in the case of a car crash is that the legs and feet of a user are withdrawn from the floor pedal area thus preventing their becoming tangled amongst this equipment during such crash. Although not shown the equipment can be supplemented by a rapid inflation bag in the region of the pedals that promotes the release and cushioning of the feet and legs of the occupant involved and that is activated on the carrier arrangement 16 reaching its frontmost position once released.

It will be appreciated that the force required to cause the release of the carrier arrangement 16 into travelling forward and becoming swivelled must be suitably pre-established to prevent a release under circumstances where vehicle control is still exercisable. In the case of a car or the like different release forces may even be applied for the driver and other passengers so that the driver can in the appropriate case still maintain control while the passengers are swivelled backward.

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It will further be appreciated that the invention finds application under all conditions where rapid deceleration can injure a person exposed thereto. It is not only limited to motorised land vehicles involved in accidents.

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